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Problems of Population Pressure in Tropical Africa

Presidential Address

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MS. received 7 July 1969

ABSTRACT—In recent years geographers have rightly and increasingly concerned themselves with the study of population, and it is widely recognized that a major world problem is that of the rapidly increasing pressure of population upon resources. But as tropical Africa is commonly regarded as underpopulated, so that economic development is often inhibited by lack of population, problems of population pressure, where they occur, tend to be ignored. There are in fact areas that show many signs of such pressure including overcropping, overstocking and soil erosion. With present trends of population growth, and under existing agricultural conditions, the pressure is likely to increase while living standards fall.

Some theories that suggest intensification of agriculture as a consequence of population pressure hardly seem justified by the facts of land use and population density that can be observed and analysed today in certain parts of tropical Africa. It certainly cannot be assumed that the special conditions of the heavily cultivated and densely peopled zone around Kano in northern Nigeria can be easily reproduced elsewhere, and there is little sign as yet of any all-embracing economic revolution in most parts of the continent.

Thus tropical Africa presents a challenge to the rest of the world, and in the assessment of its economic, social and political problems geographers should play their part alongside students of other disciplines. Current developments in the subject, with new statistical and other techniques available, make possible a fuller appreciation of these problems. British geography is well equipped to make a worthy contribution to the advancement of knowledge and the progress of mankind in tropical Africa as in other parts of the world.

THERE IS much to excite—and to alarm—in the world of geography on this first day of the year 1969. There are, for example, many signs of remarkable growth. We can see it in the ever-increasing volume of sound geographical publication by our own Institute and by other professional bodies. Several of us have recently seen some of the world-wide manifestations of activity by geographers in the coming together of over 1400 of them from more than seventy different countries in the Twenty-first International Geographical Congress in India. Here in Britain there is, alongside the ever-widening work of the Institute, the growth and consolidation of the Geographical Association, meeting like us in conference in London, while in South Kensington the Royal Geographical Society is in many respects more on the wavelength of professional geographers than ever before, and we are privileged to use part of the Society's House as our own Institute's headquarters.

But even in growth and in diversity there are dangers, and it is important that we should be aware of these and perhaps even be alarmed by some of them. There is, for example, the question of the unity of our subject. Does it exist any longer with the increasing divergence of points of view and interests between physical and human geography? I am aware that a young and enthusiastic reviewer of *Models in geography* tells us that in that large volume there is 'the breaking down of the physical geography *versus* human geography dualism' with, he suggests, general systems analysis making a specific contribution to this end (O. Slaymaker, 1968): but I am not wholly convinced by this statement. I am more conscious of how often we find our-

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selves split, organizationally if not academically, between Faculties of Arts, Science and Social Studies in our universities, between the Royal Society and the British Academy, the Natural Environment Research Council and the Social Science Research Council. Is this division good? Is it inevitable? Where is it leading us? And are we, the practitioners, in control of our destiny? These are questions that I am convinced we must constantly ask ourselves since they are questions that demand effective and realistic answers.

We need too to take account of the continuing argument between the systematic and the regional geographers even if fewer and fewer of us really believe as I do that, in T. W. Freeman's words, 'systematic and regional geography need not be thought of as rivals but rather as complementary, for each can fructify the other' (Freeman, 1961, p. 141). Some departments boast of the completeness of the rout of regional geography from the syllabus, while others still pride themselves on the dominance in their work of regional study, though this means different things in different places. I think that all that I would say on this controversy is that if we geographers are entirely concerned with *process* and not at all with *place* (and this has been said)—if we have nothing to do with environment, area, region, call it what you will—we might as well shut up shop as geographers and go home. Perhaps the name recently agreed by Council for our newsletter under Hugh Prince's editorship—*Area*—could be a useful reminder to all of us in the Institute of what must surely always be a major concern of geography. Let me recall for you Professor D. L. Linton's advice of a few years ago: 'remember always that you are a geographer whose business it is to see things not as phenomena in isolation, but as they occur together in their regional settings' (Linton, 1957, p. 21).

Another matter that should rightly concern us is the nature of the end-product of our much enlarged departments of geography. What and whom are we seeking to train? My answer to that question is unequivocally—though perhaps not very helpfully—'geographers': rounded, well-balanced, tolerant and widely-read geographers, with well-developed specialist interests and a command of the appropriate techniques, yet at the same time with an appreciation of the range of our subject that will make them adaptable to the challenge of the career that they choose to follow in research, in teaching, in planning or whatever other niche in life claims them. There are times when I feel that some of the geographers trained in our departments have so mastered the aims, the techniques, the language, even the jargon, of those working in fields of study related to geography, but not geography itself, that I ask myself, 'Are there no geographers now?' Are we necessarily better geographers if we adopt the theories of the sociologist, the symbols of the mathematician, the terms of the economist? And when the geographer does so, as on occasions he probably should, is he sure that he really understands what he is doing and saying? Do we ask ourselves sufficiently often nowadays what is there that is distinctively and positively geographical? Within our own field of geography, is a specific label an essential for every one of our graduates? Is a geomorphologist, a biogeographer, an historical geographer, a social geographer necessarily a superior being, at the point of graduation, to someone who is a geographer unadorned by any adjective? I look back on my own career where my school encouraged me particularly in physical geography and planned for me to go—in pre-UCCA days, of course—to the University of Cambridge. In fact I went to Oxford where I developed special interests in the study of population and settlement. When I graduated I was reasonably knowledgeable about the geography of India, yet I was wholly ignorant about Africa. It was only in the few months before I went to do fieldwork in Sierra Leone that I learned anything substantial about the continent that has fascinated me ever since.

I have mentioned just a few of the questions that I thought of trying to answer and of the

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themes that I was tempted to elaborate in my presidential address before I decided quite firmly that I would take a specific topic within geography. By discussing some problems of population pressure in tropical Africa I hope that I can exemplify some of my basic concepts of geography and indicate the importance of certain aspects of systematic geography within the context of a regional environment that is, in general, very different from the environments with which we are familiar in Britain. I make no apology for selecting a subject that concerns me both as citizen and as geographer, or for concentrating on a continent that is exciting and challenging and is still not known, geographically at least, as well as it should be. Looking through the eighteen presidential addresses previously given to the Institute—an interesting, even stimulating experience—I find that only one previous President, Professor R. F. Peel, has given more than a nod towards any part of Africa. Peel in lecturing on 'The landscape in aridity' (Peel, 1966) drew on his extensive knowledge of North Africa, a very different world from that of Africa south of the Sahara, and especially of tropical Africa, to which I first sailed 31 years ago almost to the very day, embarking from the Prince's Landing Stage in the Mersey, little more than a mile from the Department of Geography in Liverpool where I have now been working for a dozen years.

The study of population has, very properly in my view, been a special concern of many geographers in tropical Africa during recent years, and these problems demand yet more investigation by economists, sociologists and demographers as well as geographers if Africa is to avoid some of the particularly serious social and economic problems that already affect other parts of the Developing World. There is, moreover, a danger that the basic nature of some of these problems will be ignored until it is too late. I am thinking especially of the question of population pressure of which Sir Dudley Stamp wrote nearly 10 years ago: 'The fundamental problem which faces the world today is the rapidly increasing pressure of population on physical resources, particularly on resources of land' (Stamp, 1960, p. 13). All too often, population pressure is brushed aside in tropical Africa either as if it does not exist or, if it does, as if it calls for nothing more than a relatively slight and easy redistribution of population or perhaps some intensification in the use of resources. It is so easy and, because statistics are relatively easily available, so tempting to look at global and continental figures, and to see Africa as the least densely peopled of all the continents after Australia—with less than 10 persons per km^2 overall and, within the tropics, less than 8/km^2. There are huge areas with much lower average density figures: the whole state of Mali, for example, covering 1,202,000 km^2, has less than 5 million inhabitants (4/km^2), and Zambia (746,000 km^2) has fewer than 3.5 million (only 5/km^2). Here indeed are cases of underpopulation rather than overpopulation, where there is a lack of economic development through the absence of people rather than the problem of the pressure of population upon the land and its resources: and this in fact is the general situation as most people see it. 'Actual pressure of population on the land', M. Herskovits has written, 'has figured only in a few areas of Africa. This differentiates Subsaharan Africa from overpopulated non-industrial parts of the world such as China, India, the Nile valley, or the valley of Mexico' (Herskovits, 1965, p. 141).

These generalizations are, I believe, dangerous and misleading. Geographers must look much more closely at the nature of population problems as they vary from area to area and from one land occupance type to another: this is one of the bases of areal differentiation and of regional variation. Moreover, the population/land relationship is meaningful only in terms of the way in which the society is organized culturally, politically and economically. Behind overall figures that may suggest underpopulation there are often small areas with high densities

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of population, high especially in relation to present methods of land use and to those that seem likely to be adopted in the immediate future. Even the more generalized population distribution maps of Africa indicate areas with figures considerably higher than the average. In western Africa, for example, there are densely peopled parts in both northern and southern Nigeria, and in Ghana in the cocoa-producing belt of the south and in the savanna lands of the north-east. Rwanda and Burundi, formerly Belgian Trust Territories, provide most striking contrasts to the sparsity of population over most of the Congo basin. In Kenya more than one-third of the total population lives on less than 2 per cent of the total area at densities exceeding 150/km^2, as in the former African reserve areas of Kikuyu and Nyanza. In Tanzania there are even greater disparities: two-thirds of the mainland area is almost uninhabited, and one-fifth of the total population is concentrated on less than 2 per cent of this area, with two-thirds of the total on only 10 per cent. Densely peopled, overcrowded Sukumaland lies immediately north of a vast area that is tsetse-infested and almost without people. Overall figures so easily obscure the proximity of underpeopled areas with these remarkable local or regional concentrations of population: only detailed study reveals the very real nature of population pressure in circumstances such as these.

In recent years it has been widely recognized that some of the popular concepts that are attractive to put before our students are of doubtful validity and raise many difficulties of definition: overpopulation, for example, or underpopulation, or optimum population. Population pressure, by contrast, I feel is a more specific concept, though it too needs to be used with care. It is a relative term, meaningful only in the context of natural resources, the organization of society, the division of labour, the methods of production, the standard of living, and many other variables. It can never be given an absolute numerical value. Thus a poorly endowed area with a density as low as 4 to the square kilometre may show considerable pressure of population while another area with as many as 200 persons to the square kilometre may yet be capable of supporting still more people because of the quality of its soil, the satisfactory nature of its rainfall distribution, and the suitability of the type of farming practised. It is a fallacy to imply, as is frequently done, that population pressure results only where the density of population is high: and even an area with a high density of population and a low standard of living may not necessarily be suffering from population pressure. There is in fact no simple causal relationship between population density and poverty, though the combination of these two does often inhibit agricultural development.

I maintain that in some parts of tropical Africa there is already real pressure of population upon the resources of the land, and that this will become a progressively greater problem as population increases in the coming generations, possibly at a rather faster rate than that at which the economy of these communities develops, despite the views of writers such as Colin Clark and Ester Boserup, to which I shall refer again later. The belief that there is the phenomenon of population pressure is nothing new, something just recognized by geographers and others (W. Zelinsky, 1966): though perhaps it is worth recalling that the recognition of the great increase in world population—the population explosion as it is often called today—is relatively recent. When I first started on my work in Africa just over 30 years ago, the standard view of African population trends was that of Sir Alexander Carr-Saunders who, in a statement that is masterly for its discretion and caution, said that the population of Africa is 'probably not decreasing; it may very likely be about stationary; it is not impossible that it may be increasing, but if so the rate of increase is certainly slow' (Carr-Saunders, 1936, p. 303). Lord Hailey wrote at the same time that, for the majority of African tribes, 'it is at present impossible to say with

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confidence whether they are reproducing themselves or not, and in no case is it possible to state accurately the balance of births and deaths' (Hailey, 1938, p. 125). W. M. Macmillan observed that 'undoubtedly the population of Africa as a whole is positively inadequate' (Macmillan, 1938, p. 41).

But despite this near unanimity among the demographic and African experts of the time, I found myself immediately interested in and concerned with the various signs of population pressure: overcropping and overstocking with impoverishment and erosion of the soil and consequent declines in crop yields and in stock-carrying capacity, and intensified problems of water-supply that were often indicated by a marked fall in the level of the water-table. In Sierra Leone in 1938 I was impressed by what was being done to encourage the cultivation of swamp rice in the hitherto uninhabited and unused valley of the Scarcies river, particularly around the government rice research station at Rokupr. In the first paper that I published in our Institute's *Transactions and Papers*, the volume for 1948, I noted that the overall density of population for Sierra Leone was only 68 to the square mile [26 km^2] but even this was 'an unduly high figure for a country that is poor in resources and whose population was almost exclusively agricultural until a few years back. . . . It is an especially high density of population for a colony where shifting cultivation is universally practised, and where rice, a staple foodstuff, was produced until a few years ago almost exclusively from the uplands in preference to the swampy lowlands of either the coastal belt or of the interior river valleys' (Steel, 1949a, p. 32). Looking at the problem of exhausted, over-farmed land in Sierra Leone and the difficulty of devising alternative methods of agriculture, it seemed that there was a remedy to hand in better methods of land use and in the resettlement of population from some of the exhausted areas inland in the cleared mangrove swamp areas of the coastal districts. These new developments were in fact already relieving pressure on some of the upland rice areas, where old land was being rested and given an opportunity of regaining its fertility by natural regeneration (Steel, 1949a, p. 36).

A few years later, I was working in 1945 and 1946 in the central area of what was then the Gold Coast. I was the geographer member of the Ashanti Social Survey team under the direction of Meyer Fortes, now Williams Wyse Professor of Social Anthropology in the University of Cambridge: we were involved in what, I suppose, some would call in these days 'meaningful interdisciplinary dialogue', and my particular concern was with problems of land use, population and settlement (Fortes, Steel and Ady, 1947; Steel, 1949b). In Ashanti there was little obvious pressure of population upon the land and no serious soil erosion or soil deterioration in most of the cocoa-producing areas: but no longer were food crops being produced on such a scale that the rapidly increasing population was able to obtain all the supplies that it needed from relatively local sources. Towards the end of the second world war there had been a real scouring of the countryside by army contractors for food supplies for the armed services, and in the area of Agogo, where we undertook a comprehensive land-use survey, it was obvious that more and more of the town's food was being obtained from farms that were several miles away. The survey established the familiar pattern of West African agriculture; most of the food farms, those needing frequent attention, lay near to the town itself, whereas the cocoa farms were at a greater distance. But already this simple system was changing, and new food farms were of necessity being established well outside the immediate surroundings of the town and beyond the area largely planted with cocoa. I was sufficiently aware of possible future problems to write—and this was 20 years ago, when the general population situation nearly everywhere was much easier than it is today—'No longer can even the blindest administrator

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look upon West Africa as a great "open space", nor can serious observers talk of limitless possibilities and overwhelming natural resources. Population is growing, in many districts rapidly, in a part of Africa that has not been over-endowed by nature; and every sign in West Africa today calls for increased care, and more co-ordination, and greater efficiency in the use of the land, and particularly in the use of the soil, which will surely always be West Africa's most valuable and fundamental asset' (Steel, 1949a, p. 42).

Subsequently the facts of pressure of population, at least in certain limited and defined areas, were established in many other parts of tropical Africa: A. T. Grove's work, first in the Onitsha and Owerri districts of eastern Nigeria and later in parts of northern Nigeria (Grove, 1951, 1957, 1961), is typical of the enquiries carried out by geographers often in collaboration with appropriate government departments. But perhaps the most significant and telling of all the expositions of the problem of population/land relationships in tropical Africa came not from a geographer but from an administrator, the late Sir Philip Mitchell, who, while Governor of Kenya, noted in a despatch 'Land and population in East Africa', published in 1952, how District Commissioners in Kenya had been watching the race between population and resources over a long period. 'It is clear', he wrote, 'that most East African tribes are increasing rapidly in numbers, and the best available evidence seems to point to an annual increase which may amount to 2 per cent in the most favourable areas. That means that the population doubles itself in thirty-five years' (Mitchell, 1952, p. 3). The increase of population at this rate was, Sir Philip suggested, especially because of the removal under British rule of population checks such as tribal warfare, famine, pestilence and infanticide, and he noted the improvements in the standard of living which influenced the survival rate both in infants and aged people, even though the infant mortality rate remained high. As the cattle, sheep and goat population was also increasing at a very fast rate, the carrying capacity of the land was being strained to the utmost, and he called therefore for an immediate investigation of these land-use and other problems not just in Kenya but in East Africa as a whole. As a result of his plea—and of the almost simultaneous outbreak in Kenya of the Mau Mau troubles—the East Africa Royal Commission was appointed in 1953 and reported 2 years later. In the Report it played down the population issue, quoting a sociologist-statistician to support its conclusion that Sir Philip had overstated the case (*East Africa Royal Commission Report*, Cmd. 9475, 1955). Indeed it claimed that underpopulation in East Africa was a far more serious problem from the point of view of economic development than pressure of population, and there is in fact much strength in its argument for East Africa as a whole. But this is not to deny what Sir Philip had written, and today—a decade and a half after the Commission collected its evidence—there are certainly many areas in East Africa where there is considerable pressure of population. Many of the former African reserves in Kenya within 80 km of Nairobi, in the Kikuyu area and the Kamba and Machakos Districts, show all too obvious signs of pressure of population on the land where traditional methods of agriculture are followed: one of the encouraging aspects of post-independence farming in Machakos is the manner in which African farmers are increasingly realizing the value of terracing, manuring and better land-use methods generally. In Uganda the cultivation of excessively steep slopes, leading to soil erosion, has made essential new patterns of settlement and the adoption of improved methods of farming in the Kigezi District (J. W. Purseglove, 1946), while in Tanzania D. N. McMaster in his study of regional balance in the Bukoba District, undertaken 10 years ago, refers to the 'formidable problem' of pressure on the land (McMaster, 1960, p. 87), and C. Brooke has related food shortages in parts of Tanzania to population growth and consequent population pressure (Brooke, 1967).

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There is similar evidence of population pressure, and of its signs in the landscape and in the societies affected, in many other parts of tropical Africa, even in countries such as Rhodesia that one does not normally associate with overpopulation or with an excessively large African population. J. R. V. Prescott (1961) in his study of the congestion of the African areas of Matabeleland noted overpopulation and overstocking, in marked contrast to adjacent but underdeveloped European farm lands: this emphasizes the political aspects of this type of problem in some countries of Africa today. More recently P. Hamilton (1965) has shown how, in the Chiweshe African Reserve, 100 km north of Salisbury, population pressure has developed so dramatically during recent years that the number of cultivators is more than double what the system of cultivation, if functioning correctly, should support: indeed the average being farmed is nearly three times the maximum desirable and the grazing area in consequence is proportionally far too small, so that there is heavy overstocking.

Serious though these problems in Rhodesia are, they might be capable of solution by political action, though only if there were a change of heart on the part of the European and some redistribution of the relatively small total population of 4 million Africans and less than a quarter of a million Europeans. Much more difficult is the situation in parts of West Africa, which has a much higher density of population overall, especially in those areas where there are already serious soil erosion problems and irremediable overcropping and overstocking. By way of example two areas may be quoted, one in the savanna and the other in forest country. J. M. Hunter, under whose guidance I have seen at first hand some of the problems of the Nangodi district of north-eastern Ghana, has shown the extent of overcrowding and overworking in this grassland area, with the incidence of soil erosion being reflected in extensive and ever-widening gullies (Hunter, 1967a). By measuring nutritional levels he has shown that there is a 46 per cent deficiency in caloric intake just before each harvest (Hunter, 1967b). Another indication of the degree of pressure of population is suggested by the stream of emigration, particularly of the younger men, to seek employment in the economically developed areas of southern Ghana. Under the fixed-farming system of this part of Ghana one might reasonably expect an absolute maximum density of about 100 persons per km^2, but in fact the density of population is such that there are over 400 persons per km^2, so that they are carrying four times the theoretical maximum load. Possibly even more serious is the situation in some of the eastern parts of Nigeria which were formerly covered by high forest. According to the last reliable Nigerian census, that of 1952–53, the Eastern Region of Nigeria had an overall density of population of 160/km^2, with the figure rising in the Orlu Division of Owerri Province to 630/km^2. The notorious but spectacular examples of 'bad land' relief and soil erosion are the direct result of overfarming and the use of primitive, destructive methods of cultivation (B. Floyd, 1965, p. 33). In recent months the situation has been immeasurably worsened by the tragic civil war which has concentrated the Ibo population in a yet smaller area where farming has suffered inevitable neglect, thereby increasing still more the very acute problems of food shortage and of famine.

There is, therefore, a very considerable and telling body of evidence about pressure of population in some areas in Africa, and it is Canute-like to ignore it and to hide behind the potentialities that are often claimed for the apparently wide open spaces of many parts of Africa. This is especially true if we agree with the generally accepted view that the population of nearly all African states is increasing, often very rapidly. Whatever our view of the accuracy of African population data—and they are vastly better than they were—many of the facts are beyond dispute; and there has been a great increase in the amount of documentation and in the

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analysis undertaken by geographers, demographers, sociologists and others (see, for example, K. M. Barbour and R. M. Prothero, 1961; and J. C. Caldwell and C. Okonjo, 1968). In Ghana, where the 1948 census was reasonably good and the 1960 census one of the best taken anywhere to date in tropical Africa, there was an increase over 12 years from 4.1 million to 6.7 million (Hunter, 1965); Kenya's total population increased from 5.4 million in 1948 to 8.6 million in 1962 (W. T. W. Morgan and N. M. Shaffer, 1966); and equally high figures could be quoted for many other areas. These growth rates may not be as rapid and dramatic as those that are common over much of Latin America, and they are not being recorded in areas that already have overwhelmingly serious population problems, as in many parts of monsoon Asia. But they are sufficiently great to make us stop talking as if Africa's *only* problem was that of underdevelopment, the direct consequence of a lack of population. Would it not be wise, in the light of world population trends, if we made the fullest and most careful appraisal of the population studies already undertaken in different types of area, so that the major gaps in our knowledge could be recognized and action taken to fill them?

At this point I must return to the views expressed by, among others, Colin Clark and Ester Boserup. Clark argues vigorously that rapid population growth, far from creating problems of food supplies and pressure of population, stimulates the transformation of the agricultural systems of traditional societies and has a beneficial effect upon economic development (Clark, 1967). Similarly Mrs. Boserup contends that the growth of population is a major determinant of technological change in agriculture (Boserup, 1965), and argues that technical, economic and social changes are unlikely to take place within primitive agriculture unless the community concerned is exposed to the pressure of population growth. Her examples, perhaps significantly, come largely from parts of Asia, but her thesis should rightly be tested in tropical Africa. Certainly there are areas where ways and means have been found to support high densities of agricultural population. In the appropriately termed close-settled zone of the Kano area of northern Nigeria there is an area extending for at least 160 km in all directions from the city of Kano with intensive cropping and concentrated pasturing of flocks and herds. As a result, one of the densest concentrations of population on the African continent is supported—a total of nearly 2.5 million, with an average density (excluding Kano city) of nearly 200/km^2: in parts, the rural population is estimated to exceed 400/km^2. Thus Kano Province illustrates what can be done under certain circumstances where necessity dictates drastic action and where the people are alive to new possibilities. Continuous cropping is made possible by the regular use of animal manure, and livestock movements are carefully controlled, so that crop yields are maintained year by year at a relatively high level. The investigations of geographers such as M. J. Mortimore and A. D. Goddard have underlined the success of indigenous agriculture in supporting a large and growing population over extensive areas of northern Nigeria (Mortimore and J. C. Wilson, 1965; Mortimore, 1968; Goddard, 1968), and here there are undoubtedly many lessons for those other parts of Africa that must now, or in the near future, face up to similar challenges of population pressure upon the land and its resources. But there can be no room for complacency nor for the unqualified acceptance of the Clark and Boserup viewpoints, since there are already indications that, in parts of northern Nigeria, the limit of crop production may have been reached from the existing area of cropped land, while population increase shows no sign of diminution. W. Allan's idea of a critical population density, developed in *The African husbandman* (1965), is a concept limited to the type of traditional society in which he carried out his studies and developed his theme, but it is also a theoretical analysis of great practical importance. Yet we must be careful not to assume too

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readily that experience elsewhere in the tropics is necessarily applicable to conditions in some other parts of the tropics. Here in the study of critical population density is a field of research awaiting much more investigation by geographers than it has so far been given.

In concentrating attention on cases of population pressure in tropical Africa I do not want to suggest that it is everywhere a major problem, either now or in the future; it is a matter, however, that demands attention, if population growth in Africa is to be prevented from becoming the well-nigh insoluble problem that it already is in the densely peopled lands of monsoon Asia or that it may well become in the Latin American countries with their exceptionally high rates of population increase. Clearly much can, and will, be achieved by a relatively simple redistribution of population or by the intensification of agricultural methods. But we must be realistic, not theoretical, in seeking such solutions. The facts are that, over very large areas of tropical Africa, the system of farming is still that usually known as 'shifting cultivation' or 'bush fallowing', and the most common implements still the axe and the hoe; G. H. T. Kimble was able to write as recently as 1960, 'So little has the pattern of this type of farming changed that many nineteenth-century descriptions of it still have a very topical flavour. What has changed most is its areal extent, which has declined; and the terms on which it is practised, which have generally deteriorated' (Kimble, 1960, i, p. 133). Many of the myths about tropical productivity have been exploded though some are still believed, especially those that relate to the extensive equatorial rain-forest areas, and the prospects of any real agricultural revolution still seem generally remote, although high hopes are entertained for the agricultural development of certain areas, such as the Middle Belt of Nigeria (S. A. Agboola, 1968). Some of the most significant changes to date have been in the production of export crops such as cocoa, coffee and sisal, not of basic foodstuffs, and there has been a reluctance to introduce new and productive food crops such as rice in many areas. The integration of crop production with livestock rearing has sometimes proved successful where domestic livestock can be kept, as over much of northern Nigeria: but again realism suggests caution. The widespread distribution of the *Glossina* or tsetse fly, combined with inadequate water supplies or insufficient fodder, at present limits the rearing of livestock over vast areas, and there is as yet little evidence of any breakthrough, despite intensive veterinary research and water-boring campaigns. Modernization of agriculture, even the large-scale introduction of ploughs, has also met with only limited success, and some of the failures have been notorious, including the East African Groundnut Scheme in what was then Tanganyika (A. Wood, 1950), the Mokwa Project in Nigeria (K. D. S. Baldwin, 1957), and the Gonja Development Scheme in northern Ghana (T. E. Hilton, 1959; K. B. Dickson, 1968).

In the light of the very real difficulties that face crop production and the rearing of livestock, would it be sensible for tropical Africa to concentrate on the development of its non-agricultural resources and to import many of its basic food requirements? It is potentially, with Latin America, the most productive continent for hydro-electricity, though in its tropical areas its other power supplies are limited apart from Nigerian oil. There are already dams and associated power stations at Kariba on the Zambezi, Akosombo on the Volta in Ghana, and the Owen Falls on the Nile in Uganda, and other major schemes are in progress or in an advanced stage of planning, as on the Niger at Kainji, and on the Kafue in Zambia (R. J. Harrison Church, 1968; Steel, 1968a). But important though these are—and absolutely vital to the development of the countries concerned—it is unlikely that they will transform the economy and society from being predominantly agricultural to essentially industrial, even if the growth of population and improved living standards provide the new manufacturing industries with much

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larger markets than they have at present. Similarly with the exploitation of mineral and forest resources, important developments are probable in many states, though their impact will be limited and the areas directly affected by them are likely to remain quite small. Copper, for example, has been the backbone of the Zambian economy for several decades, and the transformation of the Copperbelt landscape, in contrast to its almost wholly rural surroundings, is most striking; but the actual area involved covers less than 10,000 km^2, and the population living on the Copperbelt, both African and European, does not exceed 500,000, less than 14 per cent of Zambia's total of 3.6 million (Steel, 1957; G. Kay, 1967). An equally right sense of perspective is also needed to appreciate the current picture of manufacturing activity in tropical Africa: in the three countries of East Africa, Kenya, Uganda and Tanzania, only 100,000 out of a total population of 22 million are employed in manufacturing (A. M. O'Connor, 1966).

These facts along with others of a similar nature suggest that in tropical Africa we are faced with one of the greatest challenges of our time. Politically there has been, over the last decade and a half, a dramatic emergence of a new world of recently independent states forming part of what we now call the Afro-Asian bloc. This constitutes a powerful force, whether we like it or not, for good or for ill, in the United Nations and in the counsels of the world today. Economically there have been changes—sometimes very striking changes—though, as previously suggested, these must not be overstressed and should be seen in perspective. Socially there have been important changes too: with political independence there has developed a new élite, and often new groupings and alignments, though with the tragic Nigerian situation in mind it would be rash to suggest that tribalism has lost its influence and that new nations everywhere have been safely and successfully born and are making steady steps forward to stability and prosperity. With population growth, patterns of settlement are changing, and one special new phenomenon, that of urbanization, is likely to become a problem of ever-increasing intensity over much of tropical Africa: indeed it is already very acute in urban areas such as Accra, Lagos and Nairobi, small though these towns and cities are compared with their counterparts in other continents (Steel, 1961; A. L. Mabogunje, 1968).

These political, economic, and social changes—taking place as they are at varying rates and often pulling in different directions—are bound to create tensions and produce new and unexpected situations. It is not impossible that there will be political upheavals leading to transformations such as we have seen in the U.S.S.R. and in China during the twentieth century: among the factors that might cause fearful revolution rather than gradual evolution could be the intransigence and inflexibility of the European, as in Rhodesia, or the continued dominance of the white man alone, as in the Republic of South Africa. But whatever the political climate, Africa today and in the years to come will be a continent of many problems, with an increasingly vital role to play in the international scene of the last part of the twentieth century. The rest of the world cannot afford to ignore it, and in the focusing of the attention of scholars upon tropical Africa one hopes that geographers will not be behind their colleagues in economics, sociology, psychology and political science, for there is no doubt that they have much to contribute to many fields of enquiry and to the solution of some at least of the problems that trouble and perplex Africa and Africans at the present time. Indeed their work has grown most strikingly since 1945 in both quality and quantity, as a series of assessments carried out on various occasions, particularly associated with International Geographical Congresses, shows very clearly (Steel, 1952, 1956, 1964, 1967, 1968b).

When I look back over the years since I entered the University of Oxford to read the

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Honour School of Geography, I am very struck by the changes in our subject during that period. Little of what I did then, I suppose, is directly relevant now: it is perhaps a sobering reflection for us all to realize that one of my successors in office—possibly even someone in the audience today—may be saying just this early in the twenty-first century about what we plan to teach, so earnestly and so confidently, to the present generation of undergraduate and postgraduate students during the coming year. Back in the 1930s we still walked in some parts of Africa because there was no alternative means of transport: this, of course, is the best way of all for geographers to see and to learn, though it is a slow and laborious method of movement. Our understanding was perhaps slight, and our methods and analysis were certainly simple compared with some of the sophistication and quantification of today: but what we had to say was comprehensible not only by fellow-geographers but by scholars of other disciplines as well. Today much of our effort is concerned with quantitative methods, the production of models, and the use of computers; and many terms used by other scientists and social scientists are thought to be necessary, though sometimes one is tempted to ask how far they are understood and appreciated by the writers themselves and by their geographer-readers. Negative binomial models, spatial auto-correlation functions and three-dimensional vector analysis are just examples selected almost at random from the latest issue of our Institute's *Transactions*. Terms are fine, techniques are excellent, but let us beware of pursuing technology so zealously that we lose sight of the geography that we are seeking to advance. Must we talk quite so disparagingly of the 'Old Geography' and in such bated breath of the so-called and self-styled 'New Geography', a term used incidentally many times during the long and honoured history of geography and by people as widely separated as, for example, Richard Hakluyt in 1574 and Halford Mackinder in 1887? Are we really at a parting of the ways between two different kinds of geography? Is it not that new methods and new opportunities that were never suspected before are now available to give greater range, depth and precision to our studies, and indeed to add a new dimension to it?

I believe that this is the case, and if only we can discover how to combine the best of the old with the most challenging of the new, then the further progress of our subject is assured. Professor J. I. Clarke in his contribution to the Institute's recently published memorial volume to Sir Dudley Stamp, observes that 'poverty and hunger must be eradicated at national and more local levels', and suggests that 'geographers can offer most to the study of world population and food resources by detailed analysis of small parts of the developing world' (Clarke, 1968, p. 69). Without trying to set out in detail the agenda for the further study of problems of population pressure in Africa, or any other parts of the Developing World, I think that here lies a real challenge to geographers: not just to carry out additional surveys, to do more of the same work though in different places, but to undertake more refined comparative work and to carry out a deeper analysis of the data now available, making the fullest use of the methods and opportunities now at our disposal while at the same time not neglecting the cartographic and other techniques that geographers have so successfully employed in the past.

All contributions to knowledge have their value; but as a citizen as well as a geographer I believe that those that are relevant to our understanding of some of the problems facing society in the Developing World have a special significance at the present time. As we are often reminded—so often that perhaps the meaning of it no longer registers properly with us—the ever-widening gap between affluent and developed communities like our own and the societies of the less well-endowed and less developed parts of the world is among the most critical of the issues facing humanity today. Pressure of population upon resources I cannot help but feel

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is potentially one of the most dangerous of all the world's problems, whether in densely peopled and intensively used areas such as India, or in many of the new African states that are only partially developed economically and where, despite the physical difficulties, there is considerable scope for agricultural improvement and for the transformation of their predominantly rural societies. Here, in an expanded programme of the analysis of population problems by geographers, I am convinced that we have a special part to play. Using all available information and every technique known to us, a much fuller and deeper appreciation of the problems of the lands and peoples of Africa is possible today than was the case only a few years back. Africans need our expertise, our technical knowledge and our skill, and they also deserve our understanding and our sympathy as they face problems that are almost certainly incapable of solution, certainly in the foreseeable future, unless they have the fullest help and co-operation, scientific as well as financial, of developed and more affluent nations of the world such as our own. Here, on the threshold of 1969, we geographers face challenges within geography, and challenges for geography; but I am confident that in British geography we are equipped, academically and in other ways, to make a worthy contribution to the advancement of knowledge and the progress of mankind in our own country, in some of the other similarly developed areas and in the countries of the Developing World.

NOTE

Since delivering this address I have seen Professor W. A. Hance's presidential address to the African Studies Association of the U.S.A. on 'The race between population and resources' with the sub-title 'A challenge to the prevailing view that Africa need not worry about population pressure' (*Africa Report* 13, 1 January 1968, 6–12). Professor Hance's conclusion—'that population pressure is a much more serious and widespread phenomenon in Africa than has generally been accepted' (p. 12)—is very similar to my own.

The Commission on the Geography and Cartography of World Population (now re-named the Commission on Population Geography) under the chairmanship of Dr. R. M. Prothero organized a symposium at Pennsylvania State University in September 1967. The report, edited by W. Zelinsky, L. Kosinski and R. M. Prothero will be published in 1970 under the title *Geography and a crowding world. Essays on population pressures on resources.*

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RÉSUMÉ—*Des problèmes de la pression démographique en Afrique tropicale.* Récemment des géographes s'occupent justement et de plus en plus de l'étude de la population, et il est bien reconnu qu'un des problèmes principaux du monde est la pression très montante que la population exerce sur des ressources. Mais quant à l'Afrique tropicale on la regarde d'habitude comme mal peuplée de telle sorte que le développement économique s'y retient à cause de la manque du monde, et par conséquent on ignore des troubles de la pression de la population où ils ont lieu. Il y a en effet des régions qui révèlent une telle pression, y compris l'épuisement des champs, l'encombrement de bétail, et l'érosion de la terre. Avec la tendance actuelle de l'accroissement démographique, et dans les conditions présentes de l'agriculture, il est probable que la pression s'augmentera tandis que le niveau de vie tombera.

Les faits de l'emploi de la terre et de la densité de la population que l'on peut noter et analyser dans certaines régions de l'Afrique tropicale donnent à peine raison aux théories qui proposent un renforcement de l'agriculture par suite de la pression démographique. On ne peut pas supposer que les conditions spéciales dans les environs de Kano dans le nord de la Nigérie qui sont très peuplés et bien exploités puissent se reproduire facilement ailleurs, et jusqu'ici une révolution économique qui embrasse tout se fait attendre dans plusieurs parties du continent.

Donc l'Afrique tropicale porte un défi au reste du monde, et quant à l'estimation de ses problèmes économiques, sociaux, et politiques, des géographes devraient jouer leur rôle côte à côte avec des étudiants d'autres disciplines. Des développements actuels du sujet, avec la disponibilité des techniques statistiques et d'autres, rendent possible une meilleure estimation que jamais. La géographie britannique est bien equipée pour contribuer pour une bonne part aux progrès de la science et à l'avancement de l'homme en Afrique tropicale comme dans d'autres parties du monde.

ZUSAMMENFASSUNG—*Probleme des Bevölkerungsdrucks im tropischen Afrika.* In den vergangenen Jahren haben sich die Geographen mit Recht zunehmend damit befasst, die Bevölkerung zu untersuchen, und es wird weithin anerkannt, dass der rasch wachsende Druck der Bevölkerung auf die zur Verfügung stehenden Mittel in der ganzen Welt ein wichtiges Problem ist. Da jedoch das tropische Afrika allgemein als unterbevölkert gilt, so dass die wirtschaftliche Entwicklung oft durch Bevölkerungsmangel gehemmt wird, werden Probleme des Bevölkerungsdrucks, wo sie auftauchen, leicht ignoriert. Es gibt tatsächlich Gebiete, die viele Anzeichen eines solchen Drucks, landwirtschaftlichen Raubbau, Überbelieferung und Bodenerosion einbegriffen, aufweisen. Bei der gegenwärtigen Tendenz des Bevölkerungswachstums und unter den bestehenden landwirtschaftlichen Bedingungen wird sich der Druck wahrscheinlich verstärken, während der Lebensstandard sinkt.

Einige Theorien, die eine Intensivierung der Landwirtschaft als Folge des Bevölkerungsdrucks vorschlagen, scheinen kaum gerechtfertigt angesichts der tatsächlichen Bodennutzung und Bevölkerungsdichte, wie man sie heute in bestimmten Teilen des tropischen Afrika feststellen und untersuchen kann. Es ist sicherlich nicht anzunehmen, dass die besonderen Bedingungen der stark kultivierten und dicht bevölkerten Zone um Kano im Norden von Nigerien sich anderswo leicht wiederholen liessen, und bis jetzt gibt es in den meisten Teilen des Kontinents wenig Anzeichen für eine umfassende wirtschaftliche Umwälzung.

So stellt das tropische Afrika eine Herausforderung an die übrige Welt dar. Bei der Bewertung seiner wirtschaftlichen, sozialen und politischen Probleme sollten Geographen in gleichem Mass wie Gelehrte anderer Fachrichtungen arbeiten. Gegenwärtige Entwicklungen in diesem Gebiet zusammen mit den neuen, zur Verfügung stehenden statistischen und anderen Methoden ermöglichen eine umfassendere Einschätzung dieser Probleme als je zuvor. Die geographische Wissenschaft Grossbritanniens ist gut ausgerüstet, um zur Zunahme des Wissens und zum Fortschritt der Menschheit im tropischen Afrika ebenso wie in anderen Teilen der Erde angemessen beizutragen.

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